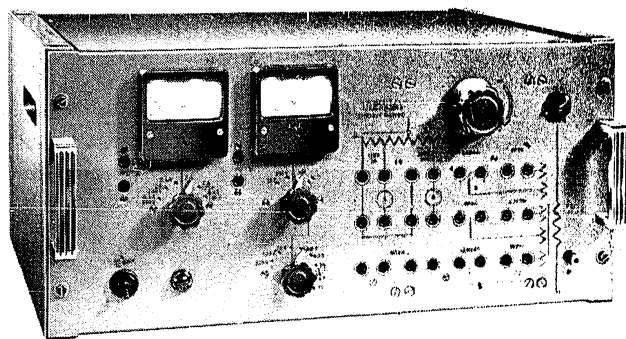


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## PANELOVÉ PŘÍSTROJE LABORATORNÍ



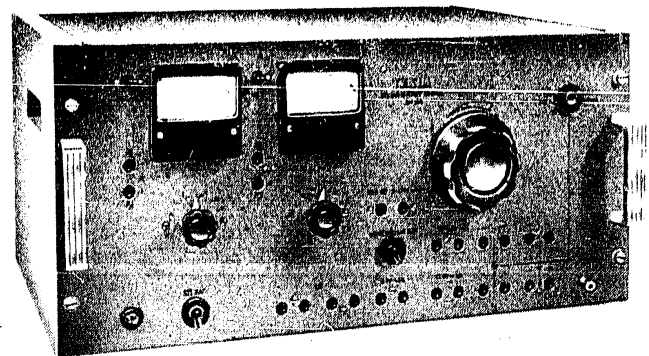
BM 207

### Středový rozvod Tesla BM 208

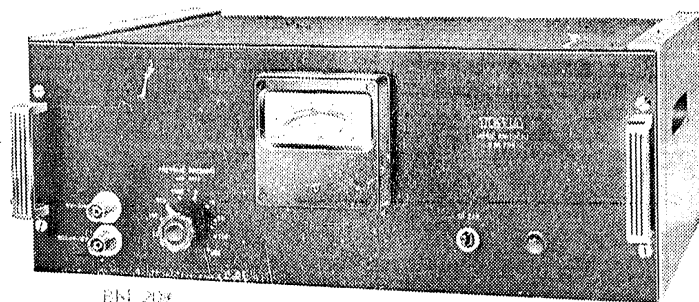
Zdroj stejnosměrného napětí regulovaného v rozsahu 0 až 250 V při odběru 300 mA, nebo 0 až 500 V při odběru 240 mA. Na panelu jsou rovněž vyvedena napětí pro žhavení běžných elektronek a střídavé napětí regulované v rozsahu 0 až 250 V.

### Střídavý rozvod Tesla BM 207

Zdroj střídavého napětí 120 V a 220 V s možností regulace  $\pm 15\%$ . Kromě toho jsou vyvedena i běžná žhavicí napětí. Proudový odběr: pro 220, 120 a 12,6 V/2 A, pro 55 V 1 A, pro 6,3; 5 a 4 V/3 A a pro 2,5 V/4 A. Maximální odběr ze všech zdírek současně 4 A. Vnitřní odpor  $< 3 \Omega$ .



BM 208



### Měřič kmitočtu Tesla BM 209

je určen k přímému měření kmitočtů 30 c/s až 0,5 Mc/s v devíti dílčích rozsazích. Lze měřit i napětí nesinusového průběhu. Měření napětí od 500 mV do 50 V může být superponováno na stejnosměrné napětí až do 500 V. Přesnost  $\pm 5\%$ .

### Q metr do 30 Mc/s Tesla BM 211

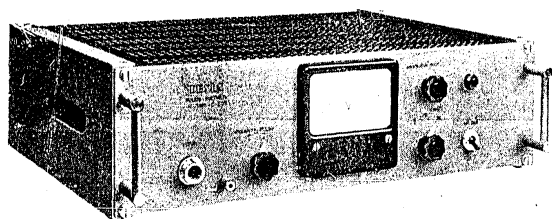
měří jakost cívek, lze jej však použít i pro měření indukčností, kapacit a určování ztrát kondensátorů a dielektrických materiálů. Rozsah měření Q je 0 až 450 ve dvou rozsazích. Přesnost údaje  $\pm 5\%$ . Kapacity lze měřit od 0,1 pF do 450 pF přímo s přesností  $\pm 3\%$ , výpočtem od 400 pF do 0,1  $\mu$ F. Indukčnosti se měří od 0,06  $\mu$ H do 0,6 H s přesností  $\pm 3\%$ . Ztrátový úhel v rozsahu 0,05% až 10% s přesností  $\pm 10\%$ .



BM 211

### Pulsní voltmetr Tesla BM 219

měří napětí impulsů obojí polarity. Jeho přednosti jsou přímé odečítání a vysoký vstupní odpor. Rozsahy jsou 5, 25 a 50 V; s pomocnými sondami lze měřit do 500 V nebo do 5 kV. Přesnost je  $\pm 5\%$ . Délky impulsů a opakovací kmitočty jsou: 0,2  $\mu$ s při 10 c/s až 8 kc/s, 0,5  $\mu$ s při 40 c/s až 14 kc/s, 1  $\mu$ s při 40 c/s až 30 kc/s, 10  $\mu$ s při 40 c/s až 7 kc/s a 20  $\mu$ s při 40 c/s až 2 kc/s.



BM 219

# OSCILLOSCOPE TESLA TM 694



## APPLICATION

The cathode-ray oscilloscope is a general purpose instrument for the viewing and study of voltage wave-forms. It is suitable for the observation of recurrent and transient phenomena. Wide frequency range and time base make the oscilloscope suitable for many purposes: for radiotechnical, electrical, physical, chemical and biological research, and for use in laboratories as well as in manufacture.

## DESCRIPTION

The fundamental components of the apparatus are the C. R. tube, the amplifiers, and the power supply. The voltage applied to the vertical deflection plates is amplified by a two-stage symmetrical amplifier fitted with automatic balancing. The voltage of the horizontal plates is amplified by a single-stage amplifier. The built-in sawtooth voltage generator can be connected to the input terminals of the horizontal amplifier thus serving as a linear time base.

The linear time base is provided by a blocking oscillator. A sinusoidal time base can be obtained by utilizing the mains frequency. A single-stage amplifier synchronizes the cathode of the time base oscillator. Two rectifiers deliver the necessary voltage.

The apparatus is fitted into a black spray-lacquered metal case.

## ADVANTAGES

Linear time base. Sinusoidal time base 50 c/sec. Internal and external synchronization. Amplifiers for the vertical and horizontal deflection plates. Wide range of the time base. Spot shift in 4 directions. Spot intensity and focus settings. Both amplifiers are linear up to 500 kc/s. A. C. with D. C. components can be connected to both inputs. The vertical amplifier is fitted with a divider 1:10. Continuous regulation of both amplifiers. The control of the time base is in steps and continuous. The time

base voltage can be used outside the oscilloscope. The control grid of the C. R. tube is connected to a terminal for modulation of the beam. The vertical deflection plates can be disconnected from the apparatus and utilized for direct study of a phenomenon. The spot is suppressed during backwards movement.

#### TECHNICAL DATA

##### Vertical amplifier

Maximum deflection sensitivity 25 mV R.M.S./cm  
Continuous gain control with divider 1:10  
Frequency range 20 c/s—500 kc/s  $\pm$  3 dB  
Input impedance 0.45 M $\Omega$ /4 pF  
Maximum D. C. component of the input 250 V

##### Horizontal amplifier:

Maximum deflection sensitivity 1.5 V R.M.S./cm  
Continuous gain control  
Frequency range 20 c/s—500 kc/s  $\pm$  3 dB  
Input impedance 35 k $\Omega$ /55 pF  
Maximum D. C. component of the input 600 V

##### Time base:

Frequency ranges  
20—60 c/s 80—240 c/s 400—1200 c/s  
50—150 c/s 200—600 c/s 800—2400 c/s  
2—6 kc/s 10—30 kc/s 30—80 kc/s  
5—15 kc/s 17—50 kc/s

Maximum frequency difference  $\pm$  10%

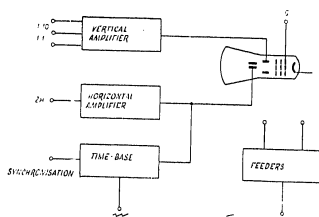
Synchronization of the time base internal — external — 50 c/s from the mains

Time base is connected to a terminal for use outside the oscilloscope.

Mains supply A. C. 120 V or 220 V — 40—60 c/s

Consumption maximum 80 W

Fuses in the mains circuit

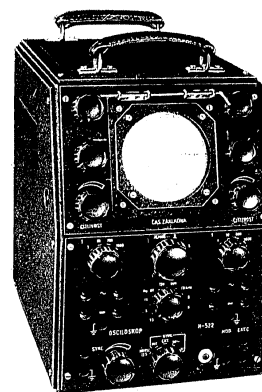


Functional Diagram

Item	Model	Dimensions mm			Weight kg	Order No.	Price
		Width	Height	Depth			
Oscilloscope	Tesla TM 691	200	270	345	11	TM 694	



## KŘÍŽIK N 522 CATHODE-RAY OSCILLOSCOPE



#### APPLICATION

The KRIZIK N 522 oscilloscope is a general purpose instrument for the display of voltage wave forms from the lowest frequencies (i. e. D. C. voltages) up to 2 Mc/s. The oscilloscope enables both recurrent and transient phenomena to be observed at voltages ranging from 10 mV to 500 V.

The wide frequency range of the amplifiers and of the time base permit the KRIZIK oscilloscope Modell N 522 to be widely used in the most diverse fields, e. g. in radio engineering, electric light-current and power engineering, physics, chemistry, biology, etc., both in research and industry.

#### DESCRIPTION

The oscilloscope is housed in a robust iron case finished in black lacquer, which protects the circuits of the oscilloscope from interference by external stray fields. All the controls of the instrument and the screen of the cathode-ray tube are on the front panel of the oscilloscope. The functions of the controls are clearly indicated. The screen is fitted with a transparent disc with graticule, and with a protective shade which prevents light from coming in from the sides.

### ADVANTAGES

The frequency response curves of the vertical and horizontal deflection amplifiers are level from 0 c/s to 0.5 Mc/s. The amplifiers are, however, usable up to a frequency of 2 Mc/s. Combined with the frequency-compensated four-step input voltage dividers, the amplifiers permit the observation and measurement of voltages of 10 mV to 500 V over a wide range of frequencies, including voltages with D. C. components, etc. (e. g. switching and impulse phenomena, biological voltages, etc.). The linear time base allows of photographic reproduction of the slowest phenomena even at the lowest frequencies.

### TECHNICAL DATA

The instrument is designed for A. C. mains operation at 220 V, 50 c/s.

#### Cathode-Ray Tube

Screen diameter 100 mm.

Sensitivity without amplifiers: vertical 12 volts per cm,  
horizontal 14 volts per cm.

For the observation of phenomena at frequencies higher than those for which the amplifiers are designed, the deflection plates are connected via 0.25-μF capacitors to sockets on the rear panel of the oscilloscope.

#### Y Deflection Amplifier

Maximum sensitivity 20 millivolts D. C. per cm — 7 millivolts R. M. S. per cm. Gain continuously adjustable over a range of 1:10, with attenuator 10×, 100×, 1000×.

Frequency response level from 0 to 0.5 Mc/s within the limit of —3 db. Frequencies exceeding 2 Mc/s are still amplified.

No phase shift from 0 to 100 kc/s.

Input impedance 2 MΩ, 30 pF.

Input: either with 1 terminal earthed, or balanced; direct for D. C. and A. C. voltages or, via 0.25-μF capacitor, for A. C. voltages only.

Maximum input voltage 500 V.

#### X Deflection Amplifier

Maximum sensitivity 30 millivolts D. C. per cm — 10 millivolts R. M. S. per cm. Gain continuously adjustable over a range of 1:10, with attenuator 10×, 100×, 1000×.

Frequency response level from 0 to 0.3 Mc/s within the limit of —3 db. Frequencies exceeding 2 Mc/s are still amplified.

No phase shift from 0 to 70 kc/s.

Input impedance 2 MΩ, 30 pF.

Input: either with 1 terminal earthed, or balanced; direct for D. C. and A. C. voltages or, via 0.25-μF capacitor, for A. C. voltages only.

Maximum input voltage 500 V.

#### Time Base

Frequency range: 1.5 to 30,000 c/s; can be extended down to 1/10 c/s or even lower by using additional external capacitor.

Synchronising of time base: either by the voltage under examination, or by mains frequency, or by external synchronising voltage.

Single sweep operation: speed similar to that of time base.

Triggered by positive impulse of about 30 V, or by short-circuiting two sockets by means of auxiliary link.

### KRIZIK N 522 CATHODE-RAY OSCILLOSCOPE

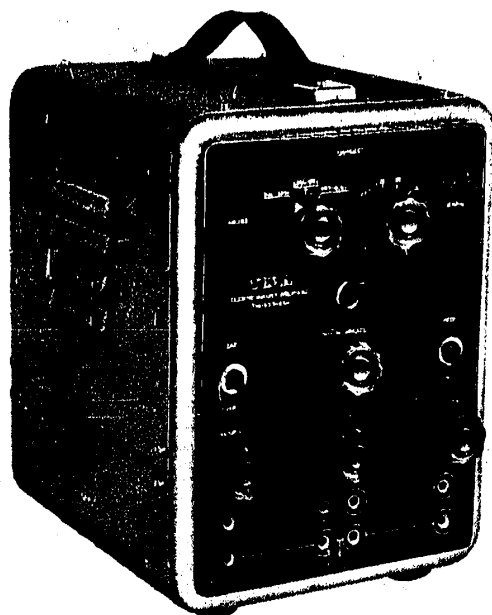
#### Valves:

- 1 × RFT CR 1/100/2
- 11 × TESLA 6 F 24
- 2 × TESLA EBL 21
- 3 × TESLA UY 1 N

Item	Model	Dimensions mm			Weight kg	Price
		width	height	depth		
Oscilloscope	KRIZIK N 522	240	375	360	19	
Stand for camera	4921	100 dia	—	370	1.30	
Camera with 25 cm supplementary lenses	Flexarota					



## THE TESLA TM 557 ELECTRONIC SWITCH



### APPLICATION

The electronic switch is an indispensable to an oscilloscope for the simultaneous viewing and study of two separate waveforms. It facilitates the ascertaining of mutual relations between two transient phenomena. If necessary, this apparatus can serve as a source of an A. C. of square waveform for the testing and measuring of amplifiers, for the study of phase shifts, frequency characteristics, transient response, etc.

### DESCRIPTION

The main part of the apparatus is a multivibrator of variable frequency delivering A. C. of square shaped waveform. The output of this generator is connected to two switching tubes which are alternately blocked and opened in such a manner that each tube is operative only for half the period. The output of these tubes is common and the output voltage can be taken either from the multivibrator or from the amplifier -the gain of which is continuously controllable. When used as a square wave generator one of the switching tubes is blocked and the other operates as a high gain limiter.

### ADVANTAGES

Easy simultaneous observation of two electrical phenomena on the screen of a single-beam C. R. oscilloscope. Continuously controllable frequency of the multivibrator. Suitable for the viewing of fairly high voltages. Suitable as a source of square wave A. C. Stability in operation. Easy and convenient in application.

## TECHNICAL DATA

Switching frequencies: continuously variable from 50 c/s to 50 kc/s  
 50—500 c/s  
 500—5 000 c/s  
 5—50 kc/s

Ranges: 30 c/s—150 kc/s  
 (at 200 k/s the drop is 3 dB)

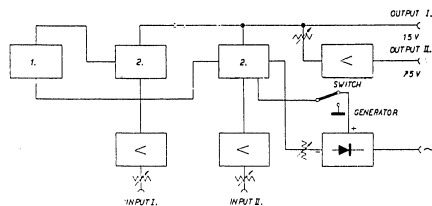
Frequency range of the amplifiers: min. 21 mV  
 max. 20 V  
 max. D. C. component 250 V

Input voltage: 15 V  
 75 V; continuously controllable

Output voltage: 2×ECH 21 — input amplifier and switching tubes  
 2×EF 22 — multivibrator  
 EBL 21 — rectifier  
 AZ 11 — rectifier

Tubes: A. C. mains 50 c/s, 120 or 220 V  
 40 W  
 0.4 A

Mains supply:  
 Consumption:  
 Fuse:

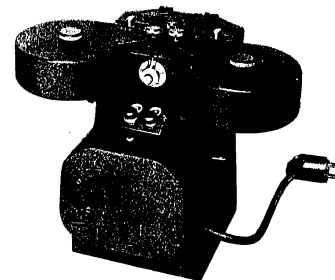


1. Multivibrator  
 2. Switch-mixer

Item	Model	Dimensions mm			Weight kg	Order No.	Price
		width	height	depth			
Electronic switch	TESLA TM 557	190	270	230	5.5		

meopta

## MEOPTA OSCILLOGRAPH RECORDER CAMERA



## APPLICATION

The MEOPTA recorder camera is designed as a supplement to any high-performance cathode-ray oscilloscope for the photographic registration of the moving trace appearing on the screen of the C. R. tube. With this apparatus it is possible to obtain an accurate record of transient phenomena, for example the response of electrical networks to suddenly applied voltages; switching transients; instantaneous variations of voltages and currents under arbitrary load variations, etc. This camera is suitable also for the recording of vibrations and shocks in the fundamentals of engines, and other similar mechanical occurrences which can be transformed into fluctuating voltages. It can be used also — in connection with an appropriate source of light — for analyzing the operation of rapidly moving mechanisms and parts of machines (such as cams, sprockets, valves, etc.).

## DESCRIPTION

The trace of the cathode-ray spot is recorded as a continuous line because the film is driven steadily past the vertical aperture and no ordinary camera-shutter is applied. Focusing is simple and reliable. The film speed is selected with gear trains; the driving motor is sufficiently powerful to maintain constant speed during operation. The movement of the gears is transferred to the film by an instantaneously acting clutch, so that the pre-selected speed is reached immediately without slow starting. Each recording can be marked on the film by exposing a luminous number and a film counter registers the length of the material used up. The camera is detachable from the drive assembly.

## ADVANTAGES

The MEOPTA recorder camera is capable of photographic registration of cathode-ray spot movements of oscilloscopes fitted with ordinary C. R. tubes. No special tubes with low-persistence actinic blue C. R. screen are required. High-precision gear trains ensure troublefree operation. Eight film speeds are available up to 1 m/sec. The camera has a film capacity of 60 metres. No waste of film before reaching operating speed of camera. High precision lens system. Easy direct focusing.

## TECHNICAL DATA

Lens: aperture f/1.8,  
focal length 35 mm.

Reels: width 35 mm,  
film capacity 60 metres.

Drive system: gear trains and instantaneous action clutch, film speeds  
5, 10, 25, 50, 100, 200, 500 and 1,000 mm/sec.

Drive motor: 3 phase (3×380 V) or single phase (220 V) — as required.

Power consumption: 120 W approx.

Item	Type	Dimensions mm			Weight kg	Order No.	Price
		width	height	depth			
Camera	MEOPTA	350	70	250	1.5		
Drive assembly		200	250	150	9.0		